# Upper Ocean Climatology from Moored Observations

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## LONG-TERM GOALS

The long term goal is to provide data that will enable scientific analyses, model development, and engineering design studies which require coincident surface meteorology and upper ocean observations from a variety of environmental regimes.

## OBJECTIVES

There are two specific objectives for the project. First, coincident records of surface forcing and upper ocean variability from twenty surface mooring experiments will be re-processed, archived, and made available to the community. Second, the updated data sets will be used to investigate the climatologies of wind-driven flow and internal waves in the upper ocean.

## APPROACH

A database of meteorological and oceanographic data from surface mooring experiments will be created, "archived" on CD-ROM, and made publicly available via a web-based server. Surface moorings have been deployed by the Woods Hole Oceanographic Institution to collect meteorological and oceanographic data in a series of experiments starting in the early 1980s. The experimental sites range from open ocean to coastal, span climatic regimes from tropical to subarctic, and include variety of forcing regimes from benign to severe. High quality meteorological records, high temporal and vertical resolution ocean data, and good overall documentation make these data sets unique.

## WORK COMPLETED

Data from ten experiments were examined, reprocessed (if necessary), and "archived" in a standard format (netCDF; Rew et al., 1993). Associated descriptive information (metadata) was compiled from various sources, and summary text, tables, and figures were generated. Web pages, based on HTML "templates" created previously, were produced for each of the ten experiments. These pages describe

the data and provide access to data files in a variety of formats. A front page for the web server was developed to provide general information and to link the experiments together. The workstation containing the database was configured as a Distributed Oceanographic Data System (DODS; Sgouros, 1999) server. We have demonstrated that the data sets presented on our web server are available using DODS protocol, although they are not yet part of the formal DODS Dataset listing.

## RESULTS

The principal result is the Upper-Ocean Mooring Data Archive web site (http://www.uop.edu/uopdata) which presently contains data and metadata for ten of the twenty experiments, representing over 75% of the total available data. The site is still under development, but has been used successfully to provide data sets to several individuals during the past year. Data are organized by experiment and can be identified using a list, a time line, or a geographic map.

The process of compiling and evaluating the data sets for presentation on the web server revealed some unexpected shortcomings. Although data files were available for most of the twenty experiments, they were not of uniform quality or completeness. In several cases the relatively straightforward process of presenting available data and metadata on the web site was complicated by an unanticipated "data archeology" effort.

## IMPACT/APPLICATIONS

Numerical weather prediction products can be evaluated by comparison with high-quality in-situ fluxes from the buoys, potentially motivating improvements to flux parameterizations and atmospheric physics in the models. The sensitivity of oceanographic models to high-frequency (hours to days) forcing can be determined using the combined air-sea flux and upper ocean data from the moorings. Satellite-based estimates of surface fluxes can be evaluated by comparison with in-situ data. Design and performance studies of ocean structures can be done using the in-situ data to provide realistic wind and current forcing for different oceanographic regions.

## TRANSITIONS

None.

## RELATED PROJECTS

We are working with Peter Cornillon's group at the University of Rhode Island to ensure that our moored data archive will be accessible through DODS, as described above.

## REFERENCES

Rew, R., G. Davis and S. Emmerson, 1993. NetCDF User's Guide. Unidata Program Center, University Corporation for Atmospheric Research, Boulder, Colorado, 185 pp.

Sgouros, T., 1999. DODS User Guide, University of Rhode Island and Massachusetts Institute of Technology, 102 pp.